

REMARKS

Claims 14-40 and 54-57 are pending in this application and stand rejected.

Claims 14, 23, 34 and 54 are independent.

The Examiner and her Supervisor are thanked for the personal interview conducted on April 15, 2003. The changes presented herein and arguments set out below were discussed generally with the Examiners during that interview, and it is respectfully submitted that this application distinguishes over the art of record at least for the reasons presented at that meeting.

By this Amendment After Final Rejection Applicants seeks to amend the specification and claim 14, 23, 34 and 54, and to add claims 71-94, in accordance with discussions during the personal interview. Upon entry of this Amendment claims 1, 23, 34 and 54 will remain independent.

The presentation of new claims 71-94 is not believed to raise new issues of patentability because those claims all ultimately depend from independent claims 14, 23, 34 or 54.

Attached hereto is a marked-up version of the changes made to the specification and claims by this amendment. The attached page is entitled "Version With Markings To Show Changes Made".

As explained in detail below, Applicants have made a diligent effort to place this application in condition for allowance. Should, however, the Examiner deem otherwise, or deem only some of the pending claims to be allowable, the Examiner is respectfully requested

to telephone the undersigned attorney at the number listed below to discuss how allowance of this application could be expedited.

**The Objection
to the Drawings**

The drawings were objected to in the Notice of Draftsperson's Patent Drawing Review which accompanied the Office Action on grounds the numbers and reference characters used in Figure 13 were not plain and legible.

A suitable substitute copy of Figure 13 is transmitted herewith.

Accordingly, favorable reconsideration and withdrawal of this objection are respectfully requested.

**The Objection
to the Specification**

The specification was objected to as failing to provide a proper antecedent basis for the aspects of claims 14, 23, 34 and 54 referring to a spring lying in a plane.

As pointed out during the personal interview, the language in question finds support in Figs. 6, 13 and 14 of this application, as they would be interpreted by those skilled in the art.

Further, in the interests of expediting prosecution, Applicants seek to amend the specification to state that the springs shown in those drawings lie in planes. As was agreed during the personal interview, this change does not introduce new matter, since it merely describes what is shown in the drawings and apparent to those of ordinary skill in the art.

Accordingly, favorable reconsideration and withdrawal of this objection are respectfully requested.

**The Rejection Under
35 U.S.C. § 103**

Claims 14-40 and 54-47 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,517,469 to Wiget in view of Japanese Patent Abstract 57-108237 to Tadashi. Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

First, it is noted that all of the pending claims, save for claims 15, 24 and 35, were specifically discussed in this rejection. Accordingly, it is believed that claims 15, 24 and 35 may be deemed to present allowable subject matter. Clarification is respectfully requested.

Turning to the merits of this rejection, it will be appreciated that, as described in claim 14, this invention concerns a spring for mounting on a substrate receiving at least a portion of the spring, the spring being formed of spirally arranged amorphous metal lying in a plane and shaped so that when the spring is mounted on the substrate the spring has an initial flexure imparted thereto. The spring serves as an energy storage device.

Further, Applicant's invention, as set out in claim 23, involves mainspring for mounting on a substrate receiving at least a portion of the mainspring, the mainspring being formed from spirally arranged amorphous metal lying in a plane and shaped so that when the mainspring is mounted on the substrate the mainspring has an initial flexure imparted thereto.

As recited in claim 34, this invention also pertains to a hairspring for mounting on a substrate receiving at least a portion of the hairspring. The hairspring is formed of spirally arranged amorphous metal lying in a plane and is shaped so that when the hair is mounted on the substrate the spring has an initial flexure imparted thereto.

Applicant also have invented a mainspring for mounting on a substrate receiving at least a portion of the mainspring. This mainspring has a plurality of spirally arranged laminated amorphous metal sheets lying in a plane and is shaped so that when the mainspring is mounted on the substrate the mainspring has an initial flexure imparted thereto.

Thus, it will be appreciated that the present invention involves a spirally-arranged amorphous metal spring (1) lying in a plane, and (2) having an shape such that, when the spring is mounted, the spring has an initial flexure.

Applicants respectfully submit that none of the cited references, whether taken alone or in combination, suggest all the aspects of the present invention.

For instance, since Wiget's Figure is only diagrammatic, those skilled in the art would not consider that spring to lie in a single plane; in this regard, Wiget states:

In the embodiment shown **diagrammatically and by way of non limitative example in FIG. 1**, the timepiece according to the invention, generally referenced 1, includes a source of mechanical energy consisting of a barrel spring. This barrel spring, referenced 2, has only been shown in a very diagrammatic way as it can be of the same kind as any one of the well-known barrel springs used in conventional mechanical timepieces.

(col. 4, lines 36-43).

Accordingly, one skilled in the art would not interpret this drawing as showing or suggesting a spiral spring located in a plane, much less a spring having a shape which results in an initial flexure of the mounted spring, as now claimed.

Turning to Tadashi, while Tadashi's discussion of background art mentions a gear rotation regulating spring, Tadashi only depicts and describes in detail a battery contact spring made from amorphous metal. Accordingly, it is respectfully submitted those skilled in the art only would be led to use Tadashi's material in a battery contact spring. Even assuming,

Even assuming, *arguendo*, that Tadashi that is construed as teaching a gear rotation regulating spring, Tadashi does not depict that spring, and so the shape of that spring cannot be determined. Further, Tadashi in no way suggests that the spring be shaped to provide for an initial flexure, when mounted, as is claimed. This means that Tadashi does not remedy the deficiencies of Wiget with regard to the claimed invention; the combination of Wigert and Tadashi in no way suggests a spiral spring of amorphous material lying in a plane, or the spring being shaped to provide an initial flexure, when mounted.

Applicants also wish to point out that U.S. Patent No. 5,772,803 to Peker et al., applied in the previous rejection, in no way suggests the claimed invention. Peker teaches torsional and helical springs, which do not lie in a single plane. Also, Peker does not teach that the spring shape should result in an initial flexure, when mounted.

The remaining rejected claims, claims 15-22, 24-33, 35-40, 55-57, and new claims 71-94, all ultimately depend from and so incorporate by reference all the features of independent claims 14, 23, 34 and 54. Accordingly, these claims patentably distinguish over the cited art at least for the same reasons as their respective base claims, which reasons are incorporated by reference herein.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

Applicants respectfully submit that all outstanding rejections and objections have been addressed and are now either overcome or moot. Applicants further submit that all

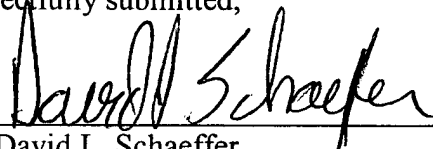
claims pending in this application are patentable over the prior art. Reconsideration and withdrawal of those rejections and objections is respectfully requested.

In view of the foregoing revisions and remarks, Applicants respectfully request entry of this amendment and submit that entry of this amendment will place the present application in condition for allowance. It is further submitted that entry of this amendment can be approved by the Examiner consistent with Patent and Trademark Office practice, since the changes it makes should not require a substantial amount of additional work by the Examiner. It is believed that the changes presented in this amendment either address matters of form or issues that the Examiner has previously considered.

Early and favorable consideration of the above referenced application in light of these amendments is earnestly requested.

Respectfully submitted,

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Attachment: "Version Marked to Show Changes Made"

VERSION MARKED TO SHOW CHANGES MADE:

IN THE SPECIFICATION:

Page 20, before the paragraph beginning at line 5, add the following new paragraph:

--As depicted in Fig. 6, the amorphous mainspring 31 is spiral in shape and is arranged to lie in a single plane.--

Page 26, before the paragraph beginning at line 16, add the following new paragraph:

--As also shown in Figs. 13 and 14, the hairspring 470 is spiral in shape and is arranged to lie in a single plane.--

IN THE SPECIFICATION:

Amend claims 14, 23, 34 and 54:

14. (Thrice Amended) A spring for mounting on a substrate receiving at least a portion of the spring, said spring being formed of spirally arranged amorphous metal lying in a plane and shaped so that when the spring is mounted on the substrate the spring has an initial flexure imparted thereto, and serving as ~~a source of power~~ an energy storage device.

23. (Thrice Amended) A mainspring for mounting on a substrate receiving at least a portion of the mainspring, said mainspring being formed of spirally arranged amorphous metal

lying in a plane and shaped so that when the mainspring is mounted on the substrate the mainspring has an initial flexure imparted thereto.

34. (Thrice Amended) A hairspring for mounting on a substrate receiving at least a portion of the hairspring, said hairspring being formed of spirally arranged amorphous metal lying in a plane and shaped so that when the hair is mounted on the substrate the spring has an initial flexure imparted thereto.

54. (Twice Amended) A mainspring for mounting on a substrate receiving at least a portion of the mainspring, the mainspring comprising a plurality of spirally arranged laminated amorphous metal sheets lying in a plane and shaped so that when the mainspring is mounted on the substrate the mainspring has an initial flexure imparted thereto.

Add claims 71-94:

--71. (New) A spring as in claim 14, wherein said metal comprises Ni-Si-B, Ni-Si-Cr, Ni-B-Cr or Co-Fe-Cr amorphous metal.

72. (New) A mainspring as in claim 23, wherein said metal comprises Ni-Si-B, Ni-Si-Cr, Ni-B-Cr or Co-Fe-Cr amorphous metal.

73. (New) A hairspring as in claim 34, wherein said metal comprises Ni-Si-B, Ni-Si-Cr, Ni-B-Cr or Co-Fe-Cr amorphous metal.

74. (New) A mainspring as in claim 54, wherein at least one of said amorphous metal sheets comprises Ni-Si-B, Ni-Si-Cr, Ni-B-Cr or Co-Fe-Cr amorphous metal.

75. (New) A spring as in claim 14, wherein said metal has a σ_{\max} (kgf/mm²) of at least 340 and an E (kgf/mm²) in the range of 9,000-12,000.

76. (New) A mainspring as in claim 23, wherein said metal has a σ_{\max} (kgf/mm²) of at least 340 and an E (kgf/mm²) in the range of 9,000-12,000.

77. (New) A hairspring as in claim 34, wherein said metal has a σ_{\max} (kgf/mm²) of at least 340 and an E (kgf/mm²) in the range of 9,000-12,000.

78. (New) A mainspring as in claim 54, wherein at least one of said metal sheets has a σ_{\max} (kgf/mm²) of at least 340 and an E (kgf/mm²) in the range of 9,000-12,000.

79. (New) A spring as in claim 14, wherein said metal has a circular cross-sectional diameter of at least 0.05 mm, or a rectangular cross-sectional shape at least 0.01 mm thick and at least 0.05 mm wide.

80. (New) A mainspring as in claim 23, wherein said metal has a circular cross-sectional diameter of at least 0.05 mm, or a rectangular cross-sectional shape at least 0.01 mm thick and at least 0.05 mm wide.

81. (New) A hairspring as in claim 34, wherein said metal has a circular cross-sectional diameter of at least 0.05 mm, or a rectangular cross-sectional shape at least 0.01 mm thick and at least 0.05 mm wide.

82. (New) A mainspring as in claim 54, wherein said laminated amorphous metal sheets, together, have a circular cross-sectional diameter of at least 0.05 mm, or a rectangular cross-sectional shape at least 0.01 mm thick and at least 0.05 mm wide.

83. (New) A spring as in claim 14, wherein said spring is manufactured using any of a single roll process, a dual roll process or a rotation underwater spinning process.

84. (New) A mainspring as in claim 23, wherein said mainspring is manufactured using any of a single roll process, a dual roll process or a rotation underwater spinning process.

85. (New) A hairspring as in claim 34, wherein said hairspring is manufactured using any of a single roll process, a dual roll process or a rotation underwater spinning process.

86. (New) A mainspring as in claim 54, wherein at least one said amorphous metal sheet is manufactured using at least one of a single roll process, a dual roll process or a rotation underwater spinning process.

87. (New) A spring as in claim 14, wherein said amorphous metal is non-magnetic.

88. (New) A mainspring as in claim 23, wherein said amorphous metal is non-magnetic .

89. (New) A hairspring as in claim 34, wherein said amorphous metal is non-magnetic .

90. (New) A mainspring as in claim 54, wherein at least one said amorphous metal sheet is non-magnetic.

91. (New) A spring as in claim 14, wherein said spring is manufactured by integrally laminating at least two amorphous metal sheets.

92. (New) A mainspring as in claim 23, wherein said mainspring is manufactured by integrally laminating at least two amorphous metal sheets.

93. (New) A hairspring as in claim 34, wherein said hairspring is manufactured by integrally laminating at least two amorphous metal sheets.

94. (New) A mainspring having a drive mechanism as in claim 54, wherein said mainspring is manufactured by integrally laminating at least two amorphous metal sheets.--.